

SECTION V

Boards

(Almost) Everything you need to know about the AM316 16 port I/O controller

Due to conflicting software addressing and which .IDV to use, we have developed a standard for using single and multiple AM316's in a system. This is for all future installations and if you already have a system down for maintenance. (In other words, don't take a running system down just to conform with this new standard).

When running a single AM316 address: Address at Hex 90
Use **AM316.IDV** (153-750-603-747)

When running two AM316's address at: First board FFFF90 (hex)
Second board FFFF70
Use **AM332.IDV** (750-111-122-352)

When running three AM316's address : First board FFFF90 (hex)
Second board FFFF70
Third board FFFF50
Use **AM348.IDV** (604-367-234-206)

When running four AM316's address : First board FFFF90 (hex)
Second board FFFF70
Third board FFFF50
Forth board FFFFF0
Use **AM364.IDV** (121-562-016-270)

With this standard, there should be no addressing conflicts with the current boards found in our systems. Note there is a unique .IDV name for each amount of boards found in the system. That and by verifying the hash totals will insure that you have a good driver. Below are jumper settings.

Board	Address	W29	W30	W31	W32	(N= Not installed, I=Installed)
1st	FFFF90	N	I	I	N	
2nd	FFFF70	N	N	N	I	
3rd	FFFF50	N	I	N	I	
4th	FFFFF0	N	N	N	N	conflict with 1st AM300
--	FFFF60	I	N	N	I	conflict with OMNLOCK I
--	FFFF80	I	I	I	N	conflict with AM330

W7 - I (Vectored Interrupt 6)
W33- I (On-board clock enable)
(all others should be removed)

April, 1986

Switch and jumper settings for AM725 memory boards

The AM725 has multiple memory sizes depending on the amount of memory chips mounted on the board. The number of memory chips on the board defines the capacity. They can be identified as follows:

(Counting from the top)
AM725-1mb has two rows of 256k chips
AM725-2mb has four rows of 256k chips
AM725-3mb has six rows of 256k chips
AM725-4mb eight two rows of 256k chips

When referencing the AM725 boards in your service reports, be sure you ALWAYS reference them this way: AM725-Xmb (rev)
{where X is the amount of memory}

Along with the old rules of mixing memory boards in the same system. The Largest memory boards are addressed lowest (or first). This is due to the address partitions of the boards.

Jumper setting: There is only one jumper location and it shouldn't ever need changing. Attached is a Page titled "7.0 System Diagnostic aid" This describes how the jumpers can be changed to move the individual banks of memory around.

Standard setting: W1-W4 & W2-W5

See the page Titled "AM725 Starting address switch settings" for addressing information.

If total memory exceeds 16mb of memory, the part going over will be automaticly disabled.

AM725 Starting Address Switch Settings

Starting Address	Switch (SW1)						Starting Address	Switch (SW1)					
	1	2	3	4	5	6		1	2	3	4	5	6
0 KB	1	1	1	1	1	n	8 MB	0	1	1	1	1	n
512 KB	1	1	1	1	0	n	8.5 MB	0	1	1	1	0	n
1 MB	1	1	1	0	1	n	9 MB	0	1	1	0	1	n
1.5 MB	1	1	1	0	0	n	9.5 MB	0	1	1	0	0	n
2 MB	1	1	0	1	1	n	10 MB	0	1	0	1	1	n
2.5 MB	1	1	0	1	0	n	10.5 MB	0	1	0	1	0	n
3 MB	1	1	0	0	1	n	11 MB	0	1	0	0	1	n
3.5 MB	1	1	0	0	0	n	11.5 MB	0	1	0	0	0	n
4 MB	1	0	1	1	1	n	12 MB	0	1	1	1	1	n
4.5 MB	1	0	1	1	0	n	12.5 MB	0	0	1	1	0	n
5 MB	1	0	1	0	1	n	13 MB	0	0	1	0	1	n
5.5 MB	1	0	1	0	0	n	13.5 MB	0	0	1	0	0	n
6 MB	1	0	0	1	1	n	14 MB	0	0	0	1	1	n
6.5 MB	1	0	0	1	0	n	14.5 MB	0	0	0	1	0	n
7 MB	1	0	0	0	1	n	15 MB	0	0	0	0	1	n
7.5 MB	1	0	0	0	0	n	15.5 MB	0	0	0	0	0	n

n = Not used

AM-725 HIGH CAPACITY MEMORY BOARDS

7.0 SYSTEM MEMORY DIAGNOSTIC AID

If it appears that a portion of your memory board is malfunctioning, but you need to continue operation with that portion of the board that is working, it is possible to reconfigure your memory board so that the malfunctioning area of memory is mapped into the upper address space that the board occupies.

There are a total of 8 banks of memory (512KB per bank) on the 4MB version of the board. As the board comes from the factory, Bank 0 resides at the memory starting address; Bank 7 resides at the memory ending address. Referring to Table 2.0, the bank sequences can be altered to position any 1MB (2 bank range) block of memory at the top of the board's memory address range by using jumper blocks W1-4 and W1-5.

This function is also very useful in diagnostic testing of the entire AM-725 Memory Board when it is the only memory board in the system.

TABLE 2.0 Memory Bank Reconfiguration Jumpers

W1/W4 Jumper	W2/W5 Jumper	Memory Bank Sequence (lowest to highest address)
In	In	0, 1, 2, 3, 4, 5, 6, 7 (factory configuration)
Out	In	2, 3, 4, 5, 6, 7, 0, 1
In	Out	4, 5, 6, 7, 0, 1, 2, 3
Out	Out	6, 7, 0, 1, 2, 3, 4, 5

NOTE: The following sized boards will not contain all possible banks; the missing banks must be eliminated from the information of Table 2 when determining memory bank sequence:

- 1) 3MB boards do not contain banks 6 and 7.
- 2) 2MB boards do not contain banks 4, 5, 6, and 7.
- 3) 1MB boards have bank sizes of 128KB (8 banks of memory). Therefore Table 2 may be used directly.

D4 - D5	AM-610 VCR Controller
D6 - D7	Unassigned
D8 - DF	AM-300 Alternate (third board)
E0 - E7	AM-400 Trident Formatter Interface
E8 - EF	AM-300 Alternate (second board)
F0 - F7	AM-200 Floppy Controller or AM-210 Floppy Controller
F8 - FF	AM-300 6 Port Serial I/O Board

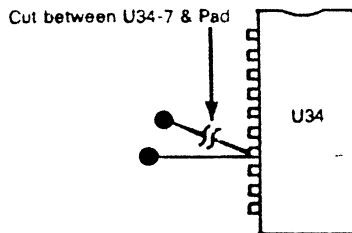
AM-420 Power Cycle Modification

This modification is designed to provide power on system reset to the AM-420 Controller circuit boards, Revisions A04 and B02. The controller boards will be deselected, thus preventing unknown conditions from being strobed into the drive during power on and power off. This modification will help insure protection of data stored on the drive when the system is reset.

Procedure

Carefully follow the steps listed below.

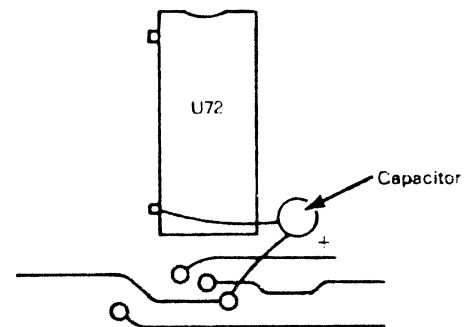
1. On the component side of the AM-420 circuit board, cut the etch between U34 pin 7 and the pad. (See below.)



AM-420 Component Side

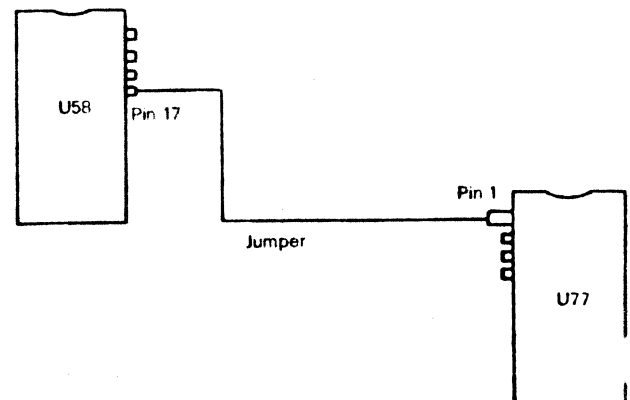
2. Add a 2.2 microfarad capacitor (CPP-00225-01) between U72, pin 10 and the pad as shown below.

The "+" side is in the pad. Be sure to install sleeving on both leads of the capacitor.



AM-420 Component Side

3. Remove U77 and replace it with a 74LS273 IC, part number IC1-74273-01. Before inserting this IC, bend pin 1 of U77 to isolate it from the board.
4. On the component side of the board, jumper U77, pin 1 to U58, pin 17.



AM-420 Component Side

5. On the solder side of the board, add a jumper between U14, pin 10 and U14, pin 11.

Sheet 4, B6

Make the following changes to the revision block.

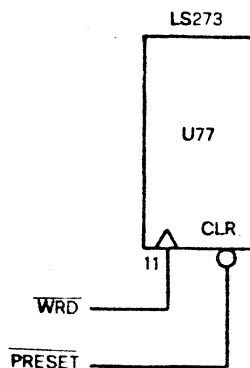
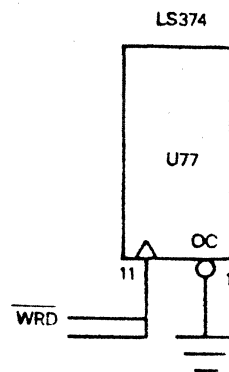
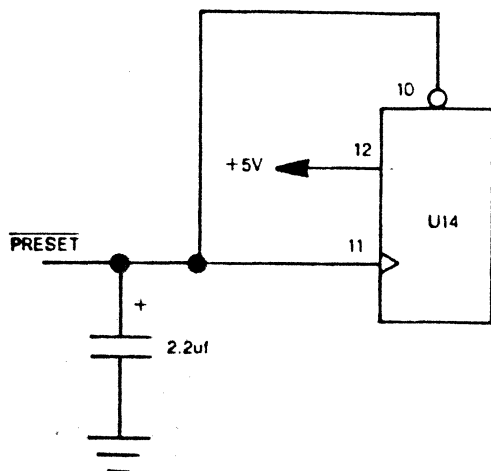
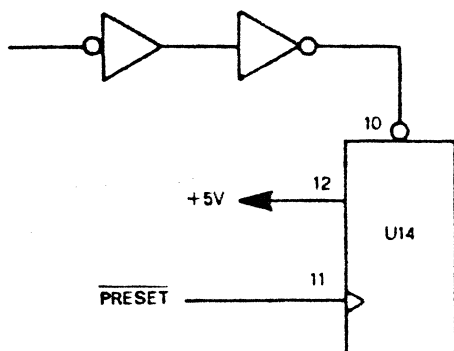
WAS IS

B02/A04 B03/A05

Schematic Changes

Make the following changes to DWL-00420-XX.

Sheet 1, A7



If you have any questions concerning this procedure, please call the System Support Group at (714) 957-0392.

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Alpha Micro has checked the information contained in this newsletter and believes it to be accurate at the time of publication. However, readers should independently determine that any information used works correctly on their system and is appropriate for their application.

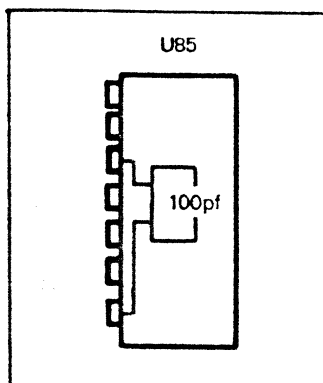
AM-420 Ground Wire Modification

The following modification is designed to increase the immunity of the AM-420 disk controller to extraneous noise that may occur during system operation. This procedure applies to AM-420 circuit boards, part numbers DWB-00420-03 and DWB-00420-00, DWB-00420-01, DWB-00420-02.

Procedure - DWB-00420-03

For the AM-420, DWB-00420-03, perform the following steps.

1. On the component side of the board, add a 100 picofarad capacitor (CPN-00101-02) between U-85 pin 3 and U-85 pin 7.
2. Add a jumper from J2-1 to ground.



Revision Level

Make the following changes to the revision block.

WAS IS

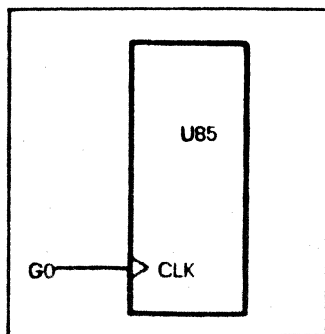
D02 D03

Schematic Changes

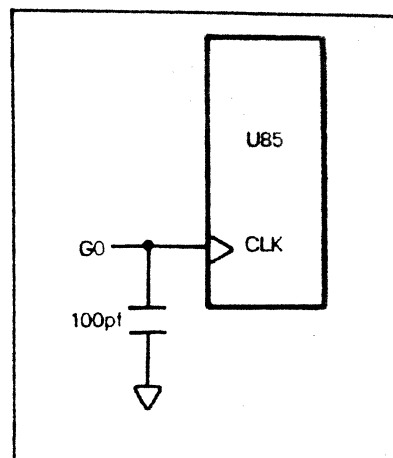
Make the following changes to DWL-00420-00.

Sheet 2D8

WAS

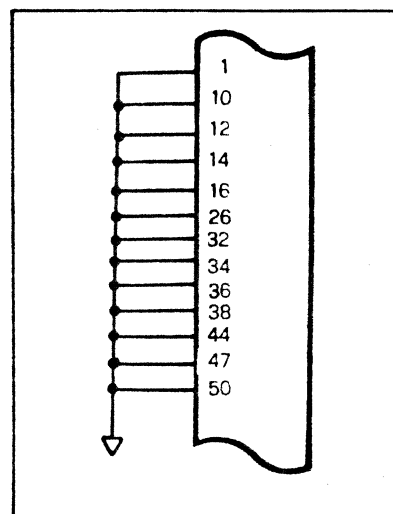


IS



Sheet 4A1

ADD



Procedure - DWB-00420-00, DWB-00420-01, DWB-00420-02

Perform the following steps.

1. On the component side of the board, add a 100 picofarad capacitor (CPN-00101-02) between U-5 pin 3 and U-5 pin 7.

Revision Level

Make the following change to the revision block.

WAS IS

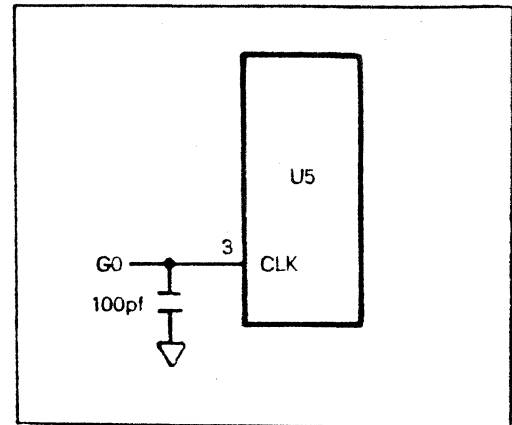
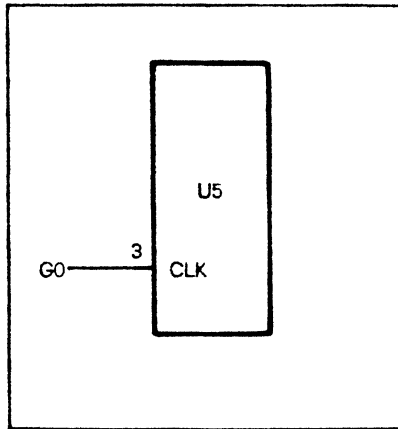
C04 C05

Schematic Changes

IS

Make the following changes to DWL-00420-XX.

Sheet 2D4
WAS



If you have any questions concerning this modification, please call our System Support Group at (714) 957-0392.

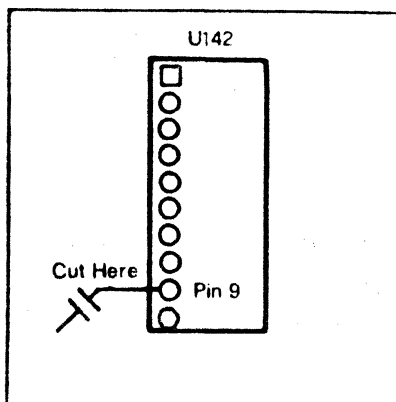
AM-1000 Modification for Use with the AM-1001

The following modification should be implemented on AM-1000s, Revision Levels A00 through A08 and Revision Levels B00 through B07. Before the AM-1001 is added, remove the AM-1000 cabinet top. (For detailed instructions on removing this top, refer to the *ISSG Newsletter*, Volume 4, Number 11, page 3.) This modification consists of a trace cut and the addition of a jumper from one integrated circuit chip pin to another.

Procedure

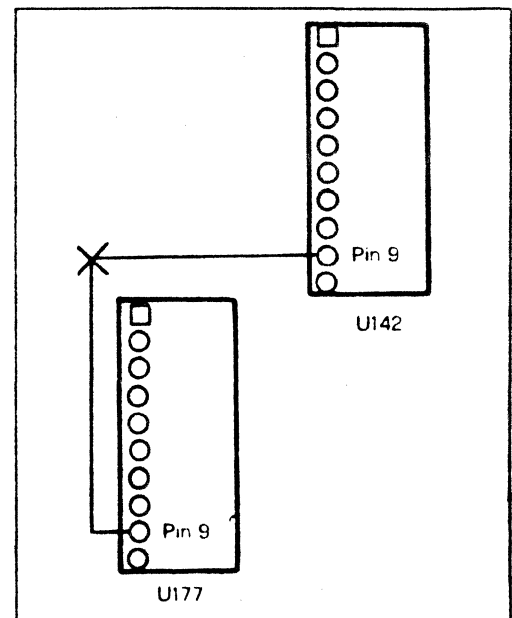
1. Locate integrated circuit chip U142. U142 is oriented toward the front and left on the main logic board in the system.
2. Cut the trace going to pin 9 of U142. Pin 9 is on the left hand side of U142 as you face the front panel of the AM-1000.
3. Locate the trace that runs from pin 9 of U142 toward the left.

CAUTION: Be sure to cut only the one trace and do not accidentally cut surrounding traces.



Cut the trace perpendicular to the direction the trace runs, just to the left of pin 9, where the trace is farthest from neighboring traces.

4. Add a jumper to the circuit board, originating from U142, pin 9, to integrated circuit chip U177, pin 9.



Good soldering technique demands that you apply a minimum amount of solder to the pin, a minimum amount of heat to the chip, and yet make a good, solid connection between the pin and wire. If you have difficulty soldering the wire to the pin, it is a good idea to wait a few minutes until the chip cools before trying again.

6.1.25 AM-1000 Booting - VCR Delay Bypass

The AM-1000 Series Computers have the built-in capability of booting from an alternate device other than the system device. This provides a means of booting the system if for some reason it cannot boot from the primary device. A VCR can be such an alternate boot device.

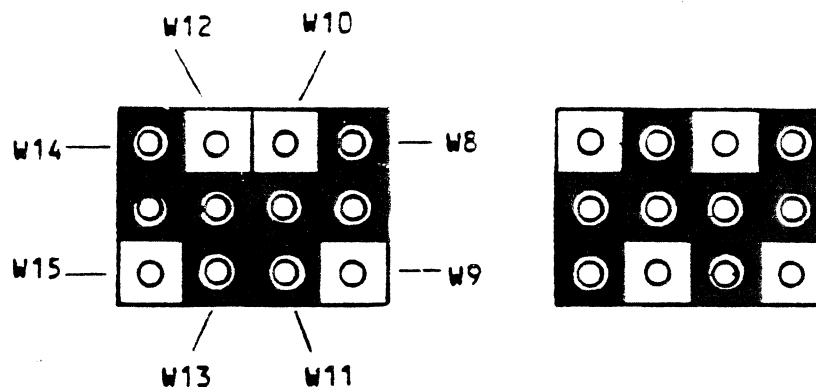
When the VCR is used as the alternate boot device, a built-in time delay allows time for valid data to be received from the VCR. If the VCR is not being used and it is desired to bypass the 25 to 30 second delay, all that is required is to change the boot jumpers.

Figure 1 shows the location of the boot jumpers on the AM-1000 CPU circuit board and the jumper configuration required for different boot devices. Notice that Boot Device ID code 9 is the only configuration identifying the VCR. Assuming that the system contains a Winchester disk as the primary booting device, all that needs to be done to bypass the VCR delay is to reconfigure the boot jumpers to Boot Device ID code A (Floppy/Winch).

Note: Beginning with C00 Revision Boot PROMS an additional delay will be encountered as the system looks to determine which Winchester disk drive is installed. This allows for the same PROM to be used for either the AM-1000 or the AM-1000E.

When the system begins to boot with this configuration, it will look to see if a floppy diskette is installed in the floppy drive. If a diskette is installed and the door is closed, the system will attempt to boot from the floppy. If these conditions are not met, the system will attempt to boot from the Winchester. If a floppy drive is not installed the system will attempt to boot from the Winchester. In both cases the VCR delay will be bypassed.

Reminder: If it is desired to boot the system using a VCR tape, the jumpers will have to be returned to the position shown for Boot Device ID code 9 (VCR/Floppy/Winch).



9

A

Boot Device Jumper Selection

Boot Device ID Code	W8	W9	W10	W11	W12	W13	W14	W15	Boot Device
9	I			I		I	I		VCR/Floppy/Winch
A	I			I	I			I	Floppy/Winch

If SuperVUE does not find a device in the system, or if it finds a device with the wrong serial number, it will go into "demo mode." In this mode, you may perform most SuperVUE operations, but cannot save the document on the disk. The most common problems causing SuperVUE to go into demo mode are:

1. Wrong device in system - For instance, SuperVUE is expecting Omnilock #456 and the system actually has some other Omnilock plugged into it. The solution is to get the correct board, or a new copy of DSK0:UNIQUE.SOV[1,20]. (Note: DSK0:UNIQUE.SOV[1,20] is the only file which is actually keyed to the board. All other SuperVUE files and overlays may be used with any type or number of security device.)
2. Omnilock at wrong port address - The Omnilock is normally used at I/O port address 20-23 hex. However, these port addresses conflict with the AM-120 board in a 100/T system, so some systems may have their Omnilocks at ports 68-6B hex, or even some other address. You can change the port address SuperVUE is looking for by using the DSK0:PORT[1,20] program.
3. Device has failed - Oh my gosh! Both the MCS8 and Omnilock have excellent reliability records, but nothing is impossible. The only solution to this problem is to get a new device, so give us a call.

HEX 68 = E1, E4, E6 JUMPERS INSTALLED (FACTORY SET)

HEX 70 = E2, E5 (ADDED TO ABOVE)

OMNILOCK II JUMPERS

E1 = MSK 80 (REVERSE LOGIC)

E2 = 40 2515

E3 = 20 2115

E4 = 10 2115

E5 = 0 2115

E6 = LSP 4 2115

0 0 0 0 0 0 = 62
0 0 0 0 0 0
E1 E2 E3 E4 E5 E6

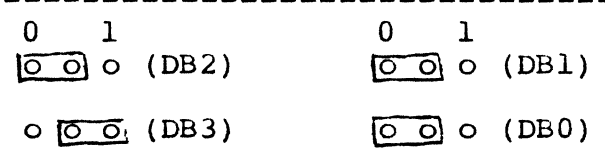
0 0 0 0 0 0 = 2
0 0 0 0 0 0
E1 E2 E3 E4 E5 E6

REF MAN.

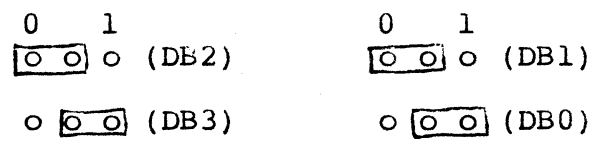
AM100L BOOT JUMPER SETTINGS
=====

JUMPERS (Installed) BE, W2, MR = T0, MW = T3, OSC
W9- normally (Factory set - do not change)
MR = T3 for MAXI 1 meg memory boards

STR, else Fujitsu, else Priam
(AM620, else AM415, else AM420)
(see note below)

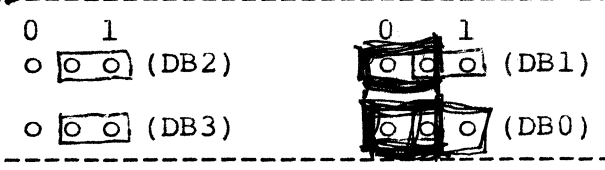


VCR, else Fujitsu, else Priam
(AM610, else AM415, else AM420)

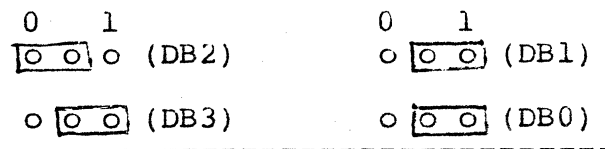


Note; If there is an AM415 in a system
along with an AM420 the system will not
look at the AM420 if the AM415 doesn't
have bootable software

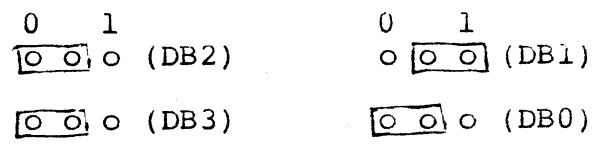
Mag Tape, else Fujitsu
(AM600T, else AM415)



Fujitsu (alone)
(AM415)



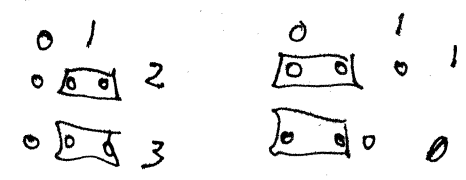
Hawk drive
(AM500)



Phoenix drive
(AM410)



MAG TAPE, ELSE / 251
(AM600T, ELSE AM415)



20
50
53
2-16
52-16

52
53
50
51
2.25
1/8

Re-ADDRESSING AM410 TO RUN ALONGSIDE AN AM415 (PHOENIX) (FOJIT80)

This procedure will allow the use of an AM-410 board with an AM-415 in the same chassis. The AM-415 will be the primary boot device with the AM-410 as a peripheral device.

Hardware Modification Procedure

1. Locate the address jumper pads between U27 and U28 on board #1 of the AM-410 board set.
2. Cut the traces at these jumper pads: (See Figure 1)
 - a. Etch at address pad 2
 - b. Etch at address pad 3
3. Jumper the following address jumper pads: (See Figure 2)
 - a. Address line 7
 - b. Address line 6
4. Locate Pin 6 of J1 at the bottom of the board. Cut the vertical trace from Pin 6 to disable interrupt level 2. (See Figure 3)
5. Jumper from the eyelet at J1 Pin 10 to the eyelet under U33 to enable interrupt level 6. (See Figure 3)

This completes the hardware modification procedure.

Software Modification Procedure

The following patch will modify the 410DVR.DVR to allow operation of the modified AM-410 board. NOTE: This patch is verified for AMOS/L Version 1.1 or later only.

1. Log into PPN[1,6] on DSK0: (the driver account)
2. Copy 411DVR.DVR=410DVR.DVR
3. Using VUE create the following patch file:
 - a. VUE AM411.M68

COPY PATCH

OHASH 732,333,770,131
NHASH 251,406,435,673

PORT=^H0FFFF1C
INT=6

.=^H18

LWORD PORT
LWORD ^H<11C-<INT*4>>

END

;New board address defined
;New board interrupt defined

;Relative address

;Insert new address
;Insert new interrupt

;End of patch

4. After the file is complete enter:

a. PATCH 411DVR.DVR WITH AM411

5. After the patch is installed in the 411DVR.DVR copy the 411DVR.DVR to the name for the peripheral AM-410 device such as "COPY SMD.DVR=411DVR.DVR.

This completes the modification process. Use the SMD device the same as you would any other peripheral device.

FIGURE 1

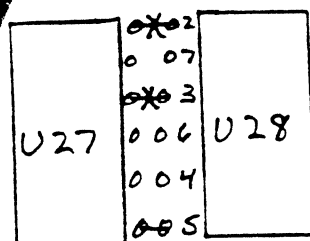


FIGURE 2

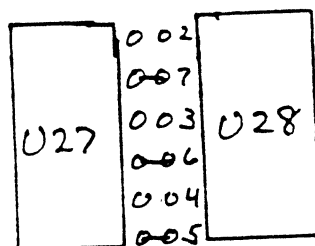
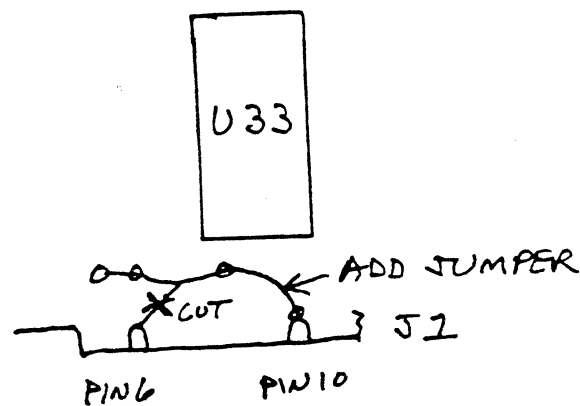


FIGURE 3



CRT 410
TO
CRT 411

410 -

411 = 410

~~411~~ 411.M68

COPY PATCH

0 HAS 405, 521, 372, 156
n HAS 326, 240, 573, 433

. = # H Ø C E

cmp

A1, # # H Ø 4 B1 C

END

;"UN-OFFICIAL" Patch for second AM420 in a system.

Hardware changes

Change VI from 5 to 4

Between U79 and U80 there are 12 solder pads.

is: 0 0 change to: 0 0
 0 0 0 0
 0-0 0-0
 0-0 0-0
 0-0 0 0
 0 0 0-0

* USES AM500 ADDRESS + VI

;Create this file and call it AM421.M68

```
COPY    PATCH
PORT    ^=H0FFFFC8
INT      =4
         .=^H18
LWORD    PORT
LWORD    ^H<11C-<INT*4>>
END
```

;Create your driver using FIX420

;Then type PATCH xyz.DVR WITH AM421

;This should hopefully redirect the software to the new board.

;Both drives attached to their separate controller should be addressed as
;drive #1. (Not #1 and #2)

After you have entered the *M* followed by a carriage return, the *EML>* prompt appears on the screen. Enter an *X*. The following messages will then appear on the screen:

Please wait...
Sending mail to:
Do you want to pick up mail from the Electronic Post Office (Y or N)?

Always answer *N* to this query. The prompt *EML>* then appears again. Enter another *X* to go back to AMOS command level. Now, AMTEC can be entered to take you back to the main menu.

If you have any questions concerning the use of AMTEC, or the MESSAG category, please call the Technical Education Department at (714) 957-6076.

AM-410, AM-420, AM-610 Controller Board Modifications

This modification is designed to reduce noise on system input and output which may cause communication problems between the AM-410, AM-420 and AM-610 controller boards and their respective storage devices. One of the most common symptoms of this possible problem has been system lockup. This modification is designed to aid in the improving of communication lines between the controller board and drives or VCR.

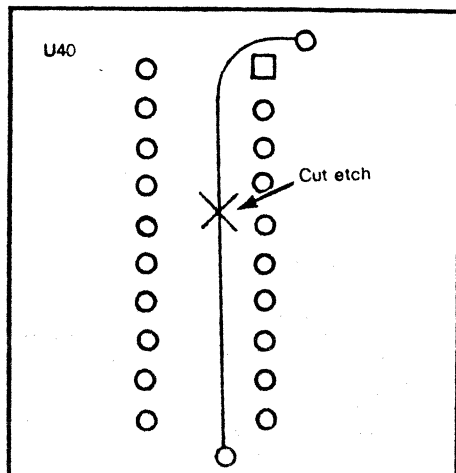
PROCEDURE

If your AM-410 and AM-420 has a Signetics 74LS138 at U26 or your AM-610 has a Signetics or Fairchild 74LS138 at U70, then you should implement the procedure described below. A Signetics IC may be identified by the letters SB below the IC identification number. A Fairchild IC may be identified by the F below the IC number.

AM-410 AND AM-420 PROCEDURE:

On AM-410 Board #1:

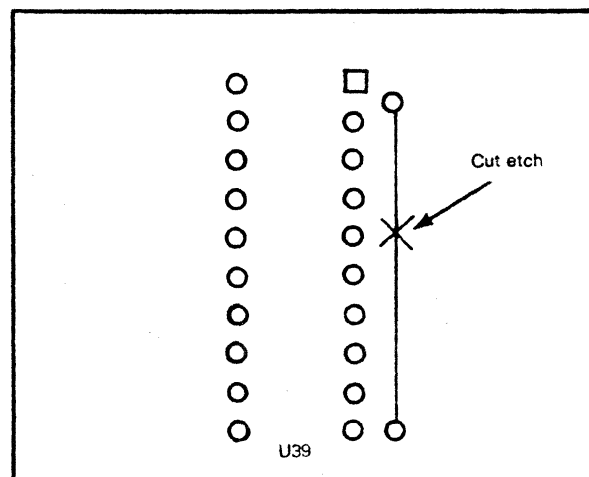
1. Locate U40.
2. Locate the trace running along the left-hand side of pins 1-10 on the solder side of the board.
3. Cut an etch along this trace.
4. Locate U39.
5. Locate the trace running along the right-hand side of pins 1-10.
6. Cut an etch along this trace.
7. Turn the board onto the component side.
8. Locate U29 and U39.
9. Locate U29 pin 7.



10. Place a 100 picofarad capacitor (CPN-00101-01) to the

left between U29 and U39 with one lead connected to U29, pin 7 and the other lead to the feedthrough to the left of U39 pins 1 and 2.

11. Place a 220 ohm resistor (RS2-00221-00) to the left of U39 with one lead connected to the feedthrough to the left of U39 pins 1 and 2 and the other to the feedthrough to the left of U39, pin 10.
12. Locate U30 and U40.



13. Place a second 100 picofarad capacitor (CPN-00101-01) to the left of U30 below pin 8, with one lead connected to U30 pin 8 and the other to the feedthrough located in the left-hand, upper corner of U40, just above pin 1.
14. Place a second 220 ohm resistor (RS2-00221-00) to the left of U40 with one lead connected to the feedthrough located to the left of the upper left-hand corner of U40, above pin 1 and the other to the feedthrough above pin 46 on the edge connectors.
15. Stamp the board with the latest revision level.

AM-410

	IS	WAS
DWB-00410-01	F06	F05

If your board is revision F04 or earlier, add DI-754A to the revision block.

AM-420

	IS	WAS
DWB-00420-XX	C01/B05	C00/B04

If your board is revision B09/B03 or earlier, add DI-754A to the revision block.

Important Notice To AM-1000 Users

To ensure optimum performance when transferring data to the AM-1000's Winchester or floppy drives from other disk devices using the VCR subsystem, Alpha Micro recommends that additional copies be specified when running the VCRSAV program. This will ensure that the drive on your AM-1000 will have time to seek the appropriate track and write to it. The optimum number of

additional copies is dependent upon the difference in the relative access times of the disk storage device from which data is being transferred.

For example, in performing a Phoenix to floppy data transfer via video tape, it is advisable to provide 10 - 20 extra copies to ensure that the floppy system has adequate time to write the new data.

Notice to AM-100/L Users

All AMOS/L conversion disks and tapes are configured for use with the Soroc I.Q. 120 terminal at a baud rate of 9600. The terminal on your system must be compatible

with the SOROC 120 or 135 drivers provided for use with the VUE program, or a compatible terminal driver may be generated using the FIXTRM program.

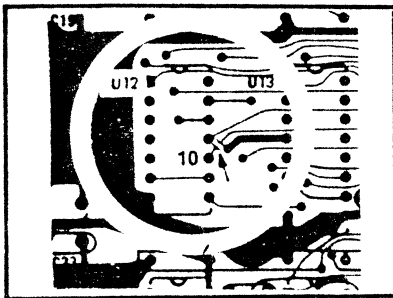
AM-420 Controller Board Reset Line Modification

This modification is *mandatory* for all Revision C AM-420 Controller Boards to help eliminate the potential for noise on the sequence counter clear line. This noise may cause blocks of data to be incorrectly written to the disk, causing scrambled user file directories, master file directories, and data files. Installation of the following modification will cause the reset line to pull high, helping to eliminate sequence counter clear line noise.

Procedure

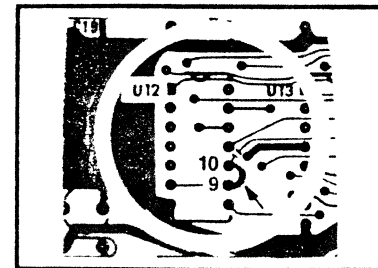
On the component side of the board:

1. Locate U-12.
2. Cut an etch at U-12, pin 10.
3. Jumper U-12, pin 9 to U-12, pin 10.



4. Mark the board with the new revision level:

IS	WAS
DWB-00420-99	CO4 C03

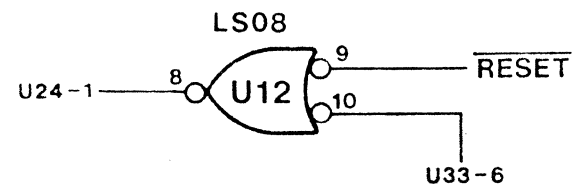


If you have any questions concerning this procedure, please call the System Support Group, (714) 957-0392.

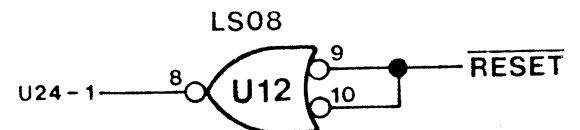
Schematic Changes

Make the following changes to DWL-00420-XX schematic, Sheet 2, Zone 5C:

Was:



Is:



AM-210 Delay Line Modification

Some floppy drive installations utilizing the Qume floppy drive may be experiencing occasional data loss problems. These problems, indicated by CRC or Sector Not Found errors, occur primarily after the read/write heads have passed the center of the diskette. If your Qume installation has been experiencing these symptoms, replacing the 500 nano-second delay line module on the AM-210 Controller board may help to alleviate this problem.

Procedure

The procedure for replacing the delay line module is as follows:

1. Locate U6, found on the upper row of I.C.'s in the

center of the AM-210.

2. Determine the nano-second value of the delay line module presently located there; a 500 nano-second delay module's manufacturer's part number will contain the number '500', and a 250 nano-second delay module's manufacturer's part number will contain the number '250'. If you have any questions concerning the nano-second level of the module, please contact the System Support Group at (714) 957-0392.
3. If the delay line module presently installed has a value of 500 nano-seconds, replace it with one that has a 250 nano-second value. This module, part number ICS-00250-00, may be obtained through the Spare

EPROM	N/D
N/D	N/D

SEEK - DATA SCIENCE
(CAIP EMULATOR BOARD)

CAIP CONTROLLER Line W/LN. REV A

1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51 53 55 57 59 61 63 65 67 69 71 73 75 77 79 81 83 85 87 89 91 93 95 97 99 101 103 105 107 109 111 113 115 117 119 121 123 125 127 129 131 133 135 137 139 141 143 145 147 149 151 153 155 157 159 161 163 165 167 169 171 173 175 177 179 181 183 185 187 189 191 193 195 197 199 201 203 205 207 209 211 213 215 217 219 221 223 225 227 229 231 233 235 237 239 241 243 245 247 249 251 253 255 257 259 261 263 265 267 269 271 273 275 277 279 281 283 285 287 289 291 293 295 297 299 301 303 305 307 309 311 313 315 317 319 321 323 325 327 329 331 333 335 337 339 341 343 345 347 349 351 353 355 357 359 361 363 365 367 369 371 373 375 377 379 381 383 385 387 389 391 393 395 397 399 401 403 405 407 409 411 413 415 417 419 421 423 425 427 429 431 433 435 437 439 441 443 445 447 449 451 453 455 457 459 461 463 465 467 469 471 473 475 477 479 481 483 485 487 489 491 493 495 497 499 501 503 505 507 509 511 513 515 517 519 521 523 525 527 529 531 533 535 537 539 541 543 545 547 549 551 553 555 557 559 561 563 565 567 569 571 573 575 577 579 581 583 585 587 589 591 593 595 597 599 601 603 605 607 609 611 613 615 617 619 621 623 625 627 629 631 633 635 637 639 641 643 645 647 649 651 653 655 657 659 661 663 665 667 669 671 673 675 677 679 681 683 685 687 689 691 693 695 697 699 701 703 705 707 709 711 713 715 717 719 721 723 725 727 729 731 733 735 737 739 741 743 745 747 749 751 753 755 757 759 761 763 765 767 769 771 773 775 777 779 781 783 785 787 789 791 793 795 797 799 801 803 805 807 809 811 813 815 817 819 821 823 825 827 829 831 833 835 837 839 841 843 845 847 849 851 853 855 857 859 861 863 865 867 869 871 873 875 877 879 881 883 885 887 889 891 893 895 897 899 901 903 905 907 909 911 913 915 917 919 921 923 925 927 929 931 933 935 937 939 941 943 945 947 949 951 953 955 957 959 961 963 965 967 969 971 973 975 977 979 981 983 985 987 989 991 993 995 997 999 1001 1003 1005 1007 1009 1011 1013 1015 1017 1019 1021 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3823 3825 3827 3829 3831 3833 3835 3837 3839 3841 3843 3845 3847 3849 3851 3853 3855 3857 3859 3861 3863 3865 3867 3869 3871 3873 3875 3877 3879 3881 3883 3885 3887 3889 3891 3893 3895 3897 3899 3901 3903 3905 3907 3909 3911 3913 3915 3917 3919 3921 3923 3925 3927 3929 3931 3933 3935 3937 3939 3941 3943 3945 3947 3949 3951 3953 3955 3957 3959 3961 3963 3965 3967 3969 3971 3973 3975 3977 3979 3981 3983 3985 3987 3989 3991 3993 3995 3997 3999 4001 4003 4005 4007 4009 4011 4013 4015 4017 4019 4021 4023 4025 4027 4029 4031 4033 4035 4037 4039 4041 4043 4045 4047 4049 4051 4053 4055 4057 4059 4061 4063 4065 4067 4069 4071 4073 4075 4077 4079 4081 4083 4085 4087 4089 4091 4093 4095 4097 4099 4101 4103 4105 4107 4109 4111 4113 4115 4117 4119 4121 4123 4125 4127 4129 4131 4133 4135 4137 4139 4141 4143 4145 4147 4149 4151 4153 4155 4157 4159 4161 4163 4165 4167 4169 4171 4173 4175 4177 4179 4181 4183 4185 4187 4189 4191 4193 4195 4197 4199 4201 4203 4205 4207 4209 4211 4213 4215 4217 4219 4221 4223 4225 4227 4229 4231 4233 4235 4237 4239 4241 4243 4245 4247 4249 4251 4253 4255 4257 4259 4261 4263 4265 4267 4269 4271 4273 4275 4277 4279 4281 4283 4285 4287 4289 4291 4293 4295 4297 4299 4301 4303 4305 4307 4309 4311 4313 4315 4317 4319 4321 4323 4325 4327 4329 4331 4333 4335 4337 4339 4341 4343 4345 4347 4349 4351 4353 4355 4357 4359 4361 4363 4365 4367 4369 4371 4373 4375 4377 4379 4381 4383 4385 4387 4389 4391 4393 4395 4397 4399 4401 4403 4405 4407 4409 4411 4413 4415 4417 4419 4421 4423 4425 4427 4429 4431 4433 4435 4437 4439 4441 4443 4445 4447 4449 4451 4453 4455 4457 4459 4461 4463 4465 4467 4469 4471 4473 4475 4477 4479 4481 4483 4485 4487 4489 4491 4493 4495 4497 4499 4501 4503 4505 4507 4509 4511 4513 4515 4517 4519 4521 4523 4525 4527 4529 4531 4533 4535 4537 4539 4541 4543 4545 4547 4549 4551 4553 4555 4557 4559 4561 4563 4565 4567 4569 4571 4573 4575 4577 4579 4581 4583 4585 4587 4589 4591 4593 4595 4597 4599 4601 4603 4605 4607 4609 4611 4613 4615 4617 4619 4621 4623 4625 4627 4629 4631 4633 4635 4637 4639 4641 4643 4645 4647 4649 4651 4653 4655 4657 4659 4661 4663 4665 4667 4669 4671 4673 4675 4677 4679 4681 4683 4685 4687 4689 4691 4693 4695 4697 4699 4701 4703 4705 4707 4709 4711 4713 4715 4717 4719 4721 4723 4725 4727 4729 4731 4733 4735 4737 4739 4741 4743 4745 4747 4749 4751 4753 4755 4757 4759 4761 4763 4765 4767 4769 4771 4773 4775 4777 4779 4781 4783 4785 4787 4789 4791 4793 4795 4797 4799 4801 4803 4805 4807 4809 4811 4813 4815 4817 4819 4821 4823 4825 4827 4829 4831 4833 4835 4837 4839 4841 4843 4845 4847 4849 4851 4853 4855 4857 4859 4861 4863 4865 4867 4869 4871 4873 4875 4877 4879 4881 4883 4885 4887 4889 4891 4893 4895 4897 4899 4901 4903 4905 4907 4909 4911 4913 4915 4917 4919 4921 4923 4925 4927 4929 4931 4933 4935 4937 4939 4941 4943 4945 4947 4949 4951 4953 4955 4957 4959 4961 4963 4965 4967 4969 4971 4973 4975 4977 4979 4981 4983 4985 4987 4989 4991 4993 4995 4997 4999 5001 5003 5005 5007 5009 5011 5013 5015 5017 5019 5021 5023 5025 5027 5029 5031 5033 5035 5037 5039 5041 5043 5045 5047 5049 5051 5053 5055 5057 5059 5061 5063 5065 5067 5069 5071 5073 5075 5077 5079 5081 5083 5085 5087 5089 5091 5093 5095 5097 5099 5101 5103 5105

3. MR jumper setting T1 through T5

T1 = 0 wait state for memory read (standard setting)
 T2 = 1 wait state for memory read — for MAXI memory B.I.
 T3 = 2 wait states for memory read
 T4 = 3 wait states for memory read
 T5 = 4 wait states for memory read

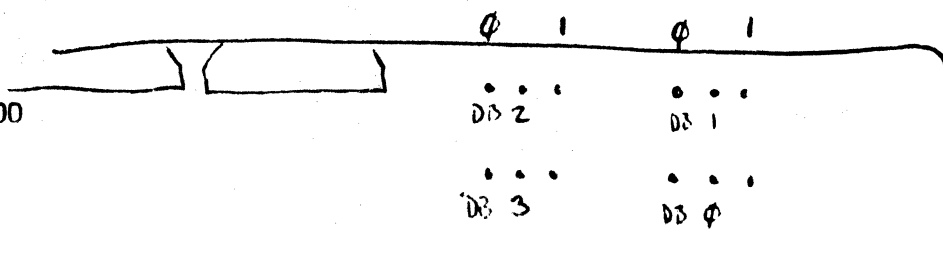
4. MW jumper setting T1 through T5

T1 = 0 wait state for memory write
 T2 = 1 wait state for memory write
 T3 = 2 wait states for memory write (standard setting)
 T4 = 3 wait states for memory write
 T5 = 4 wait states for memory write

Table II. AM-100/L Boot ID Register Summary
 (Standard Boot PROMS)

BOOT DEVICE ID CODE				Boot Device
BIT 3	BIT 2	BIT 1	BIT 0	
0	0	0	0	AM-210 Floppy Drive (CDC/Persci)
0	0	0	1	AM-410 Phoenix Drive
0	0	1	0	AM-500 Hawk Drive
0	0	1	1	Reserved
0	1	0	0	Reserved
0	1	0	1	Reserved
0	1	1	0	Reserved
0	1	1	1	AM-210, else AM-415, else AM-420
1	0	0	0	AM-621, else AM-415, else AM-420
1	0	0	1	AM-610, else AM-415, else AM-420
1	0	1	0	Unassigned
1	0	1	1	AM-415 High Performance Winchester
1	1	0	0	Unassigned
1	1	0	1	Unassigned
1	1	1	0	AM-600 - AM600/T, else AM-415
1	1	1	1	Unassigned

ON 100L BOARD:



2.6.8 AM-420 Controller Board Reset Line Modification

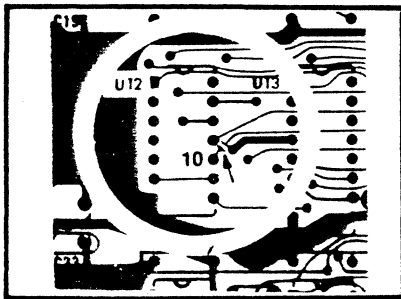
AM-420 Controller Board Reset Line Modification

This modification is *mandatory* for all Revision C AM-420 Controller Boards to help eliminate the potential for noise on the sequence counter clear line. This noise may cause blocks of data to be incorrectly written to the disk, causing scrambled user file directories, master file directories, and data files. Installation of the following modification will cause the reset line to pull high, helping to eliminate sequence counter clear line noise.

Procedure

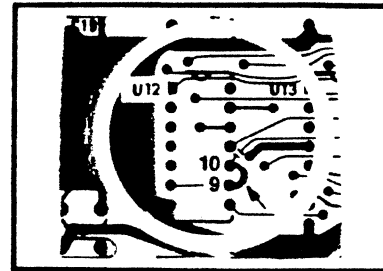
On the component side of the board:

1. Locate U-12.
2. Cut an etch at U-12, pin 10.
3. Jumper U-12, pin 9 to U-12, pin 10.



4. Mark the board with the new revision level:

	IS	WAS
DWB-00420-99	C04	C03

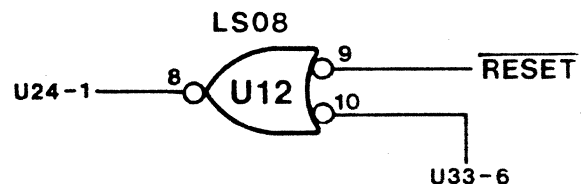


If you have any questions concerning this procedure, please call the System Support Group, (714) 957-0392.

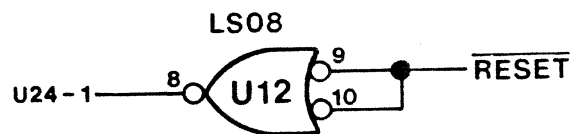
Schematic Changes

Make the following changes to DWL-00420-XX schematic, Sheet 2, Zone 5C:

Was:



Is:



2.6.9 Important Notice on Certification for Winchester Disk Users

Important Notice on Certification for Winchester Disk Users

The technology that gives Winchester disks such a high density of data also makes a small number of media flaws a common occurrence. Alpha Micro handles this situation by providing a certification program, CRT420, for use with Winchester disks that 1) run under the control of the AM-420 Winchester disk controller, and 2) are components of the AM-1000 system. The certification program searches out media flaws and builds a file called BADBLK.SYS which contains a list of all bad tracks on the disk. Whenever

the monitor subsequently accesses the disk, it consults the BADBLK.SYS file to see what tracks to avoid reading from or writing to.

It has come to our attention that some dealers routinely recertify Winchester disks after they receive them from Alpha Micro. In general, dealers recertify drives for two reasons: 1) to change the number of logical devices on the drive, and 2) because they are not aware that all Winchester drives arrive from Alpha Micro fully certified.

The Spare Parts/Logistics Department has two AM-410 Phoenix Drive Retrofit Kits available that we recommend be installed on your Phoenix drive. The CDC Low Error Option Kit - Part Number 77711032 - has been designed to provide protection for drive heads and media in the event of severely restricted air flow or blower motor failure. If one of these problems occur, the drive will spin down and will not operate until the failure is

corrected if this kit has been installed.

The second kit available is the Phoenix Pre-filter Filter Kit - Part Number PRA-01093-00. The installation of this filter on the front panel will ensure additional protection for the drive.

To order these kits, please contact the Spare Parts/Logistics Department at (714) 957-6112.

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Adding Additional AM-300 I/O Circuit Boards to an AM-100/L System

The procedure to add additional AM-300 circuit boards to the AM-100/L system differs from the procedure used on the AM-100 and AM-100/T systems. This article assumes that you are familiar with the procedures used in adding additional AM-300 I/O boards to an AM-100 or AM-100/T system.

Please remember the following differences between an AM-100, AM-100/T additional AM-300 board installation, and an AM-100/L additional AM-300 board installation will apply:

1. You may use only AM-300 Revision C00 or later boards.
2. The AM-100/L systems share the same interrupt level for all AM-300 boards.
3. The software changes to the interface driver are different.

The new AMOS/L software will support a total of eleven AM-300 circuit boards per system. This is done through the use of the same interrupt level for all eleven circuit boards (vectored interrupt level 3). For this reason, all AM-300 boards in an AM-100/L system will be set to interrupt level 3

2

through 16. A TRMDEF statement for a third AM-300 board and the second port would appear as:

```
TRMDEF TERM14,AM300=22:9600,SOROC,100,100,100
```

The source program for the AM-300 interface driver is located in PPN [10,2] and is named AM300.M68. If additional boards are to be added to the system, a new "IDV" must be generated by first modifying one line in the AM300.M68 source file. Then the file must be assembled by entering: M68 followed by the file name to generate the new driver. This line is titled "NUMBRD." The line will normally read:

```
NUMBRD=3 ; max number of boards supported by IDV
```

The I/O address of each board must be set to a specific address as shown below. Please see the table below for I/O addresses and the correct jumper settings:

Board	I/O Address	Address Jumpers					
		A3	A4	A5	A6	A7	
1st	(FFFF)F8	1	1	1	1	1	
2nd	E8	1	0	1	1	1	
3rd	D8	1	1	0	1	1	
4th	68	1	0	1	1	0	
5th	60	0	0	1	1	0	
6th	58	1	1	0	1	0	
7th	50	0	1	0	1	0	
8th	48	1	0	0	1	0	
9th	38	1	1	1	0	0	
10th	28	1	0	1	0	0	
11th	18	1	1	0	0	0	

The AMOS/L System Initialization Command File - AMOSL.INI - TRMDEF statements refers to the port numbers differently than does the AMOS software. The first AM-300 board is still called AM-300 with ports numbered from 1 thru 6. The second AM-300 board is also called AM-300; however, the port numbers are 11

This number must be changed to match the number of AM-300 circuit boards used in the system. You may use any number between 2 and 11.

NOTE: Be aware that increasing the "NUMBRD" equate will cause the AM300.IDV file to increase in size. Each additional board will cause the file to increase by 176 bytes.

If you have any questions about this procedure, you may contact either the System Support Group at (714) 957-0392 or the Technical Education Department at (714) 957-6076.

Boot PROM Reference Guide

Alpha Micro systems provide the user with the option of selecting either an AM-100 based or an AM-100/T based system. Each Integrated System also features a specific type of drive. For example, the AM-1010/1011 series is a floppy drive based system controlled by the AM-210 disk controller. The AM-1020/1021 series includes an 8.5 Megabyte Winchester drive controlled by the AM-420 controller board. The AM-1041 with a 32 Megabyte Winchester drive is also controlled by the AM-420 board, as is the AM-1061 Integrated System with a 60 Megabyte Winchester drive.

The specific PROM required for the AM-420, however, will depend upon the type of backup device included with the system, floppy, VCR, or Streaming Tape. If a Video Cassette Recorder is added to an existing AM-

1020/1021 Integrated System with a floppy backup device, then a specific PROM will be required for the AM-420. Refer to the table below.

Those systems containing an AM-420 controller board may also have only one alternate boot device for the system. If the alternate boot device is a floppy disk drive, a Video Cassette Recorder unit may be added, but not as a third boot device.

The table presented below lists the device interface and the correct setting for the AM-100/T CPU or the AM-100. The part number with the current revision level is also given. The "Current Controller Revision Level" column refers to the revision level of the circuit board now shipping from Alpha Micro. If you have any questions about these PROMs, please call our System Support Group at (714) 957-0392.

Boot PROM Reference Guide

Device Interface	AM-100/T Boot I.D. Register 3 2 1 0	AM-100 Boot Address Header (Hex)	Controller Boot PROM Part Number	Controller Boot PROM Revision	AM-100/T Boot PROM Part Number	AM-100/T Boot PROM Revision	Current Controller Revision
AM-110 CPU Link	0 1 1 0	F400	DWB-00112-00	B00	DWB-00152-03/04 ¹	C00	C03
AM-200 Persci		FC00	DWB-00206-00	D00			B10
AM-200 Wangco		FC00	DWB-00205-00	D00			B10
AM-210	0 0 0 0	FC00	DWB-00218-00	C00	DWB-00152-01/02	C00	F07
AM-400 T-25, T-50, T-200 Trident	0 0 1 1	FC00	DWB-00402-00	C00	DWB-00152-03/04 ¹	B00	A03
AM-400 T-80, T-300 Trident	0 1 0 0	FC00	DWB-00403-00	A00	DWB-00152-03/04 ¹	B00	A03
AM-410 Phoenix	0 0 0 1	F400	DWB-00412-00 ²	B02	DWB-00152-01/02	C00	F05
AM-420 with Floppy	0 1 1 1	F400	DWB-00422-00 ³	B01	DWB-00152-05/06 ³	B01	B03
AM-420 with STR	1 0 0 0	F400	DWB-00422-01	B01	DWB-00152-07/08	B02	B03
AM-420 with VCR	1 0 0 1	F400	DWB-00422-02	B01	DWB-00152-09/10	B01	B03
AM-500	0 0 1 0	F400	DWB-00501-00	D00	DWB-00152-01/02	B01	B03
AM-610 VCR	1 0 0 1	F400	DWB-00613-00 ⁴	B01	DWB-00152-09/10	B01	B03
AM-620 STR	1 0 0 0	F400		B02	DWB-00152-07/08	B02	A00

1 - 03/04 PROMs, Revision C will not support the Trident drive

1 - 03/04 PROMs, Revision B will not support the AM-110

4 - Not meant for booting

2 - Controller Boot PROM, Revision B01 supports multiple Phoenix configurations

2 - Controller Boot PROM, Revision A06 supports single Phoenix configurations

3 - 05/06 PROMs, Revision A01 (or later) supports 8.5 MB Winchester

3 - 05/06 PROMs, Revision B00 supports all Winchester drives

3 - Controller Boot PROM, Revision A03 supports 8.5 MB Winchester

3 - Controller Boot PROM, Revision B00 supports all Winchester drives

When assigning terminals to the second AM-300 through the TRMDEF statement in the SYSTEM.INI file, use the AM301.IDV in the same manner as the AM300.IDV. AM301 must be specified for the interface driver rather than AM300 in order for the system to recognize the correct driver.

Test the driver by creating a TEST.INI and then MONTST the system using the TEST.INI file.

```
*****
* USING THE AM-300 IN AN AM-100L BASED SYSTEM *
*****
```

1. HARDWARE: ONLY Rev. C and above boards are compatible

Port addresses are selected the same as when using the AM-300 in an AM-100T based system (use the jumpers), except there are more of them.

I/O ADDRESSES	BOARD NUMBER
-----	-----
0FFFFFF8	1
0FFFFFFE8	2
0FFFFFFD8	3
0FFFFFF68	4
0FFFFFF60	5
0FFFFFF58	6
0FFFFFF50	7
0FFFFFF48	8
0FFFFFF38	9
0FFFFFF28	10
0FFFFFF18	11

The maximum number of boards that can be used is 11.

2. SOFTWARE: Interrupt vector level - same for all cards = 3

When running more than one AM-300 board the only thing that needs to be changed in the software driver is the number of cards in the system. (NUMBRD=3) for example.

In the AMOSL.INI file the the port numbers in the TRMDEF statements will be as follows:

```
FIRST BOARD  port numbers are  1  to  6
SECOND BOARD port numbers are 11  to 16
THIRD BOARD  port numbers are 21  to 26
etc. through the eleventh board.
```

Table II. AM-100/T Boot I.D. Register Summary
(Standard Boot PROMS)

BOOT DEVICE I.D. CODE				Boot Prom Set	Boot Device
3	2	1	0		
0	0	0	0	DWB-00152-01/02	AM-210 Floppy Drive (CDC/Persci)
0	0	0	1	DWB-00152-01/02	AM-410 Phoenix Drive
0	0	1	0	DWB-00152-01/02	AM-500 Hawk Drive
0	0	1	1	DWB-00152-03/04	AM-400 T-25/50 Trident Drive
0	1	0	0	DWB-00152-03/04	AM-400 T-80/300 Trident Drive
0	1	0	1	DWB-00152-01/02	AM-210 Floppy (Wangco)
0	1	1	0	DWB-00152-03/04	AM-110 CPU Link
0	1	1	1	DWB-00152-05/06	AM-420 Winchester/Floppy Combination
1	0	0	0	DWB-00152-07/08	AM-420 Winchester/Streamer Combination
1	0	0	1	DWB-00152-09/10	AM-420 Winchester/VCR Combination
1	0	1	0		Unassigned
1	0	1	1		"
1	1	0	0		"
1	1	0	1		"
1	1	1	0		"
1	1	1	1		Unassigned

RUNNING MORE THAN ONE AM-300 I/O CONTROLLER

The AM-300 Serial I/O Controller in an AM-100 system is applicable to Alpha Microsystems' AM-300 Rev.A&B and is fairly straightforward. But, it is important that each step be followed exactly in order for the procedure to work properly.

The hardware and software portions will be covered separately with examples given in each area.

HARDWARE CHANGES

Two hardware items must be changed. First the board I/O address must be changed, and second, the board interrupt level must be changed.

	Suggested I/O Address	Interrupt Level
1st AM-300 board	F8(normal)	3
2nd AM-300 board	E8	6
3rd AM-300 board	D8	7

(FOR 100T ONLY)

The suggested interrupt levels are only a guide. The interrupt level you use must not be used by any other board on the system. If you have an AM-100 based system, be sure to enable the same interrupt level on the AM-100 board.

As an example, a second AM-300 board will be set up using I/O address E8 and interrupt level 6. See Figure 1 below. On the AM-300 board, find the ADDRESS HEADER and the INTERRUPT lines.

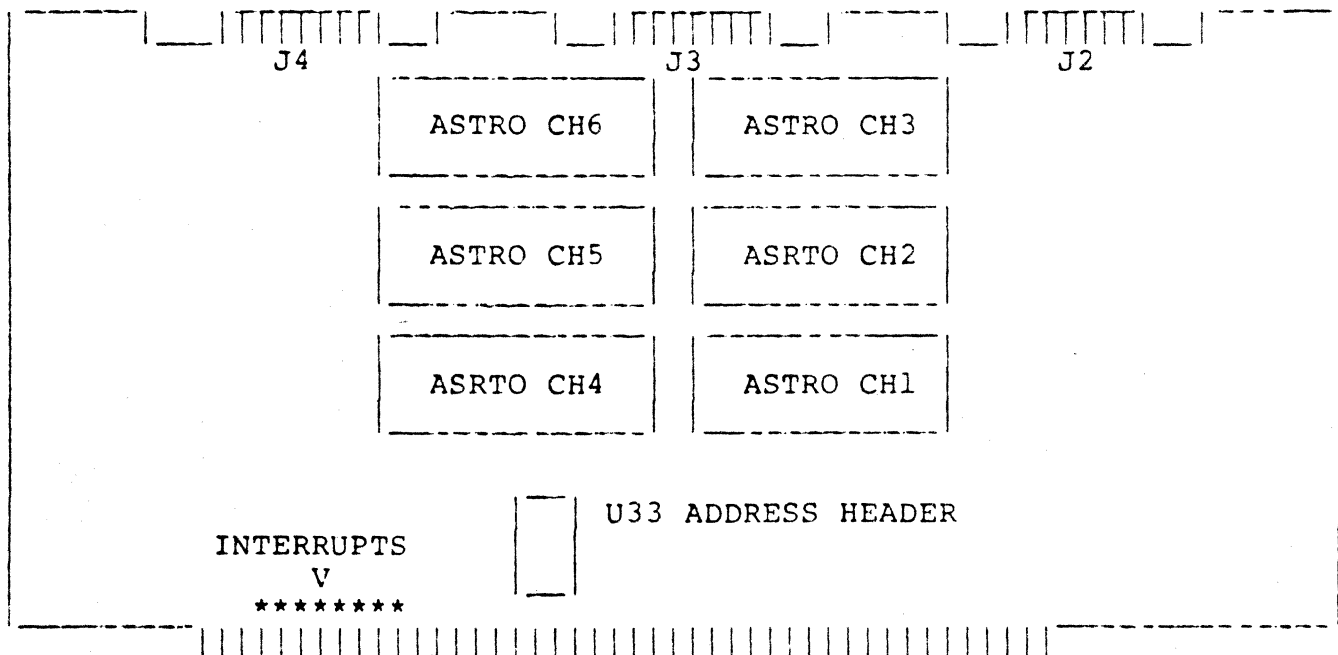
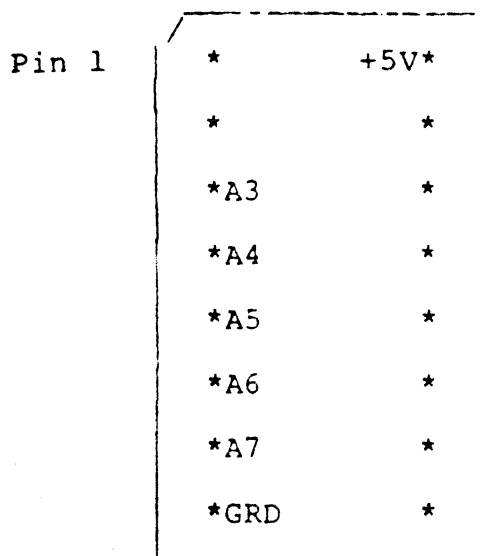


FIGURE 1 AM-300 BOARD

100T ONLY

The address header is normally set up for address F8. This header will be changed to E8. Figure 2 shows the address header and the pin identification. Pins 3 thru 7 are the address lines A3 thru A7. Pin 16 is + 5 volts and pin 8 is ground. The address lines are tied to +5 volts to make the address lines "1" level or to ground for a "0" level.



An address of F8 will have A3,A4,A5,A6 and A7 jumpered to +5 volts.

An address of E8 will have A3,A5,A6 and A7 jumpered to +5 volts and A4 jumpered to ground.

An address of D8 will have A3,A4,A6 and A7 jumpered to +5 volts and A5 jumpered to ground.

FIGURE 2
ADDRESS HEADER

After the address has been changed to E8, the interrupt level must be changed to "6" for this example. See Figure 3 for interrupt identification.

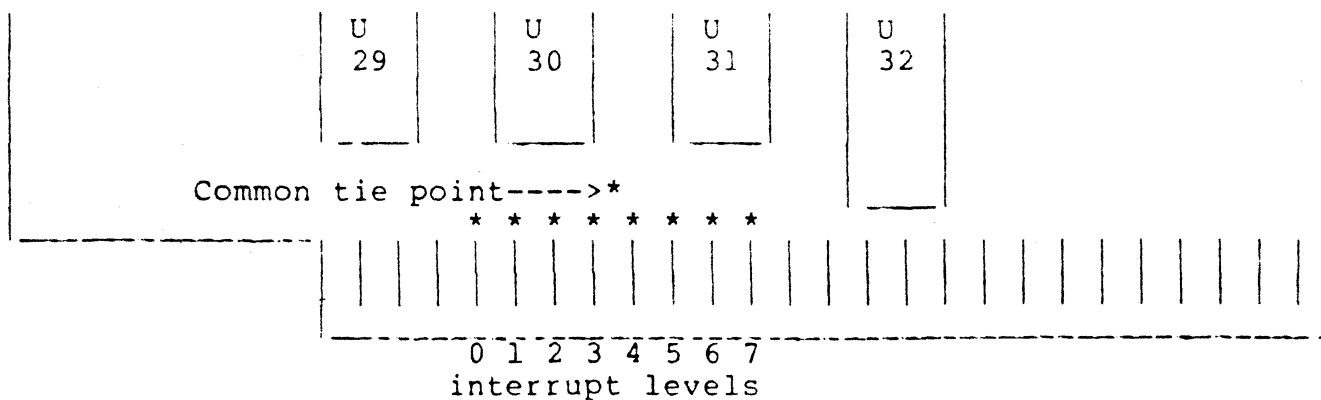


FIGURE 3 AM-300 BOARD (Lower left corner)

To change the interrupt, level the jumper (foil etch on older boards) must be installed from the common tie point to the correct interrupt pad. In this example to the pad labeled "VI 6".

Note: The interrupts are labeled on the board. The labeling may look like "V10 to V17". Should be "VI0 to VI7".

SOFTWARE CHANGES

100T ONLY

Now, a new driver must be generated for the second AM-300 board. The source for the AM-300 driver is located in PPN [10,2], file "AM300.MAC". Copy this file to "AM301.MAC". Using the "VUE" or "EDIT" program change two lines in the AM301.MAC file. In the beginning of the file are the two lines which must be changed to reflect the hardware changes.

The first; find the line that reads:

```
AMX=177770          ;BOARD ADDRESS
```

If the board address has been changed to "E8" on the header; change this line to read:

```
AMX=177750          ;BOARD ADDRESS
```

If the board address has been changed to "D8" on the header; change this line to read:

```
AMX=177730          ;BOARD ADDRESS
```

Note: The octal address is calculated by adding the address of the board to 177400 octal.

Second; find the line that reads:

```
AMV=3               ;INTERRUPT VECTOR LEVEL
```

Change this line to reflect the same interrupt level that was set up on the board. For interrupt level "6" this line should read:

```
AMV=6               ;INTERRUPT VECTOR LEVEL
```

After the two changes have been made, the file must now be reassembled using the MACRO program. To MACRO the program, type the following:

```
MACRO AM301.MAC [RETURN]
```

The MACRO program will generate two new files in PPN 10,2. They are:

```
AM301.OBJ  
AM301.PRG
```

Erase the AM301.OBJ file, it is not needed. The AM301.PRG file must be renamed to AM301.IDV and transferred to area 1,6 on the system disk where the drivers must reside.

The Spare Parts/Logistics Department has two AM-410 Phoenix Drive Retrofit Kits available that we recommend be installed on your Phoenix drive. The CDC Low Error Option Kit – Part Number 77711032 – has been designed to provide protection for drive heads and media in the event of severely restricted air flow or blower motor failure. If one of these problems occur, the drive will spin down and will not operate until the failure is

corrected if this kit has been installed.

The second kit available is the Phoenix Pre-filter Filter Kit – Part Number PRA-01093-00. The installation of this filter on the front panel will ensure additional protection for the drive.

To order these kits, please contact the Spare Parts/Logistics Department at (714) 957-6112.

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```
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```

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4th	68	1	0	1	1	0	
5th	60	0	0	1	1	0	
6th	58	1	1	0	1	0	
7th	50	0	1	0	1	0	
8th	48	1	0	0	1	0	
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10th	28	1	0	1	0	0	
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NOTE: Be aware that increasing the "NUMBRD" equate will cause the AM300.IDV file to increase in size. Each additional board will cause the file to increase by 176 bytes.

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